230. AIR AND GAS ENGINES.

A.D. 1891. JULY 7. Nº 11,550.
LAKE'S COMPLETE SPECIFICATION. (1 SHEET)

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Fig. 1.

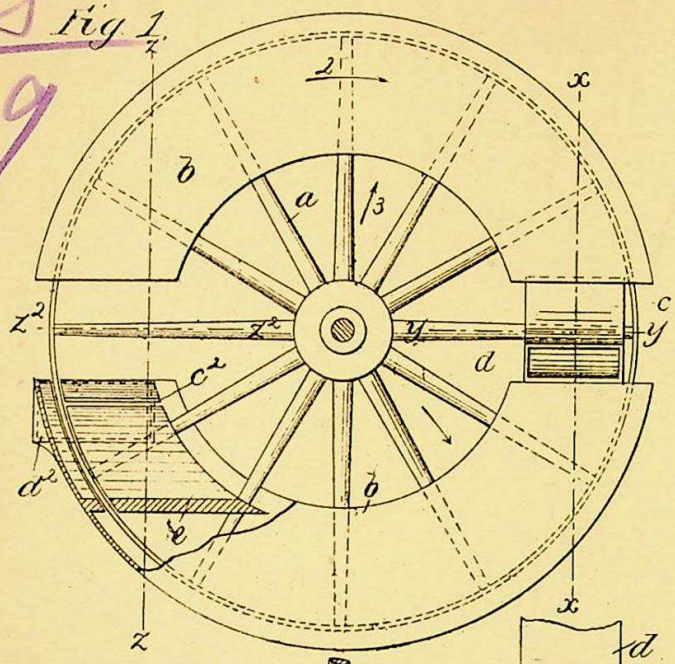
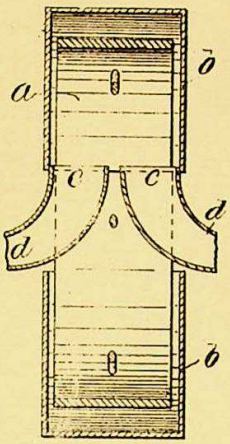


Fig. 2.



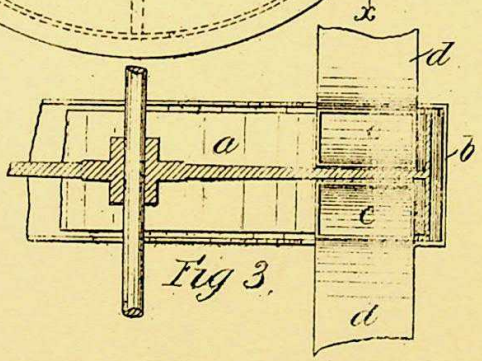


Fig. 3.

Fig. 4.

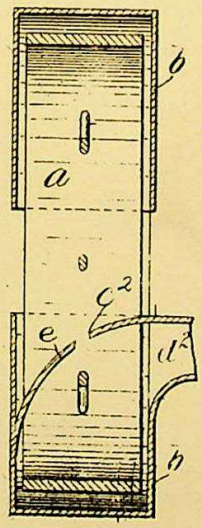
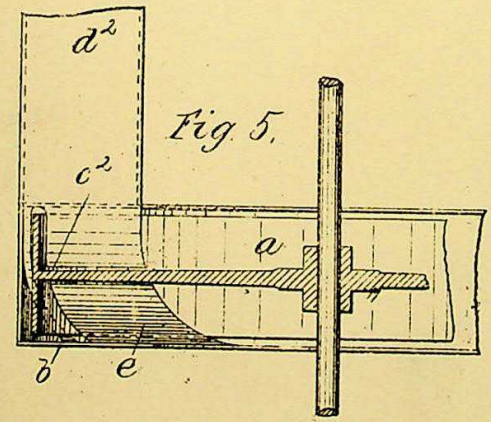


Fig. 5.



[This Drawing is a reproduction of the Original on a reduced scale.]

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Malby & Sons, Photo-Litho.

98.-PNEUMATICS,
AIR & GAS PUMPS,
Rotary.

Rotary -

28
78

N° 11,550 A.D. 1891

Date of Application, 7th July, 1891—Accepted, 22nd Aug., 1891

COMPLETE SPECIFICATION.

[Communicated from abroad by HENRY SMITH ROBINSON of 28, State Street, Boston, Massachusetts, United States of America, Mechanical Engineer.]

Improvements in Air Forcing Apparatus for use in connection with the Fly Wheels of Steam Engines.

I, HENRY HARRIS LAKE, of the firm of Haseltine, Lake & Co., Patent Agents, 45 Southampton Buildings, in the County of Middlesex, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement :—

The object of my invention is to provide means for utilizing the disturbance of the air produced by the fly wheels of steam engines for the purpose of creating air currents or blasts which may be utilized in any suitable or usual manner, either for the purpose of ventilation, for providing a forced draught for furnaces, for exhausting or removing vitiated air from apartments, or for forcing currents of air to be heated, and then employed for heating buildings, or for drying, or for other similar purposes.

The motion of the fly wheel or belt pulley of a steam engine tends to cause a disturbance of the air, throwing the same outward by centrifugal force from the hub towards the periphery of the wheel, but such movement cannot be rendered available as in ordinary centrifugal blowers, for the reason that the continuous periphery of the wheel or pulley tends to confine the air and does not afford a tangential path of escape by which the air thrown outward from the hub towards the periphery can be received in suitable ducts outside of the periphery of the wheel.

I have discovered that by combining with a fly wheel suitable deflectors or guides, the air which is thrown outward and carried around with the wheel may be directed into suitable ducts, affording a strong blast which may be utilized for various purposes without causing the expenditure of any considerable amount of additional power by the fly-wheel so that considerable saving is effected whenever it is desired to use an air blast in establishments provided with an engine.

The invention consists mainly in the combination with a fly wheel, of deflectors located between the periphery and the axis of the wheel and extended as close as possible to the inner surface of the wheel rim and to the sides of its spokes and substantially tangential thereto, the said deflectors gradually curving from their tangential position and being located at the terminals of ducts or blast pipes so that the air carried by the wheel and moving mainly in a tangential direction, with greatest force and velocity near the outer end of the spokes, strikes upon said deflectors and is carried away by them from the wheel and into the air ducts, the said deflectors, acting as it were to skim or scoop the air off from the portion of the wheel by which it is carried.

In some cases it may be desirable to have such deflectors or skimmers as they may be called, one at each side of the plan of revolution of the wheel, but when it is necessary or desirable to have the air carried away from one side of the wheel only, a deflector may be employed at the other side which curves inward towards the plane of revolution of the wheel, and thus tends to throw the air transversely to the other side of the wheel, where a skimming deflector takes the air that has thus been thrown across from the other side of the wheel as well as that from the adjacent side of the wheel, and directs it all into the air duct or blast pipe.

In the accompanying drawing,

Figure 1 is a side elevation of an air forcing apparatus embodying this invention, the fly wheel being shown as having two sets of air collecting devices, one arranged

to take the air from both sides or faces of the wheel, and the other arranged to throw the air from one to the other side of the wheel and to take the air from the side to which it is thus thrown.

Figure 2 is a partial section on line *x*, Figure 1.

Figure 3 is a sectional view on line *y* Figure 1, and,

Figures 4 and 5 are sectional details on line *z* and z^2 respectively of Figure 1.

The invention may be employed in connection with an engine fly wheel *a* of any suitable or usual construction and consists in the combination with said wheel of certain air deflecting and conducting devices to be described, by which the air which is set in movement by the fly wheel is caused to produce a definite current or blast of air in a suitable duct or blast pipe, instead of merely producing irregular and useless air currents, as is commonly done by the fly wheel of an engine.

A portion of the periphery of the wheel is enclosed in a casing *b* which may be of usual construction and the direction of motion of the wheel is indicated by the arrow 2, such motion causing outward currents of air from the hub towards the periphery as indicated by arrows 3, while at the inside of the rim and near the periphery the air is of somewhat greater density than that of the atmosphere and is carried with considerable velocity in the direction of motion of the wheel itself.

Fly wheels as commonly constructed for engines of large size have sufficient unevenness or irregularity in the periphery to cause a considerable disturbance of the air, they engaging the air by the projections formed at the junctions of the spokes with the rim, by the spokes themselves, by the junction between different sections of the rim, when the wheel is made in sections bolted together, and otherwise, so that it will not usually be necessary to change existing wheels at all in order to utilize them in connection with the air ducts and collecting device in accordance with this invention, although it is obvious that the air engaging portions of the wheel may be increased if necessary when it is desired to utilize the air currents produced by the motion of the wheel in accordance with the present invention.

At suitable points near the outer ends of the spokes and near the rim or periphery of the wheel suitable deflectors *c* are employed, said deflectors being formed at the end and constituting the mouth of a blast pipe or air duct *d* and so shaped that their end portions are substantially tangential with the path of rotation of the outer ends of the spokes so that the air carried by the spokes, and within the periphery of the wheel naturally strikes upon the said deflectors and is directed away from the wheel and into the air ducts producing the desired blast in said ducts.

As shown at the right hand of Figure 1, and in Figures 2 and 3, there are two of said ducts terminating in deflecting mouth pieces or inlet openings, within, but near the periphery of the wheel, and one at each side of the spokes thereof, thus making two independent air passages one taking the air from each side of the wheel which passages or ducts may, however, if desired be brought into one, in case a single current of air is used.

When, however, it is not convenient to take the air from both sides of the wheel independently, the construction shown at the left hand of Figure 1 and in Figures 4 and 5, may be employed, the same comprising a deflector c^2 and air duct d^2 at one side of the wheel, which may be substantially like the deflector *c* and duct *d* before described, except that the portion of the deflector extending towards the spokes makes a greater angle with their path of movement or does not come quite to the tangential position.

On the other side of the wheel and inside of the casing a deflector *e* is employed extending from the inner wall of the casing towards the spokes of the wheel so that the air carried around in the said casing is crowded over from the wall of the casing towards the spokes of the wheel, and passes across through the spaces between the spokes of the wheel to the other side, and enters the mouth c^2 of the duct d^2 which

mouth acts with a scooping action upon the air at the same side of the wheel with it while receiving the current of air which is forced over from the other side of the wheel through the spaces between the spokes as before described.

In this manner the air disturbed by the wheel instead of making local currents or being thrown off from the part near the periphery of the wheel wherever it meets an obstruction (as for example, where the wheel passes through the floor) and again drawn in through the centre of the wheel, and carried outwards towards the periphery of the wheel by centrifugal force; is caused to make a steady current having a slight exhausting or rarifying action, near the hub of the wheel and a slight condensing action near the periphery of the wheel, producing a steady pressure by which a continuous steady current or blast is maintained in the blast pipe.

It is obvious that the shaping of the ducts and deflectors by which the air is taken off from the wheel and directed into said ducts, may be varied considerably without departing from the essential features of construction and mode of operation of the invention herein described, and will depend largely upon existing conditions of the wheel and adjacent parts.

It is not essential for the operation of the apparatus herein described that the wheel should be encased although the casing contributes to the efficiency and may be made more effective by extending it further inward towards the hub of the wheel, as shown, than is usually done.

If desired a deflector may be employed at the outside of the rim of the wheel, in addition to those at the inside of the rim, such deflector in this instance crossing the space between the wheel rim and inside of the casing.

In other words, the surface e and c^2 practically constitute a single curved deflector having openings in it to accommodate the passage of the wheel rim and spokes.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, as communicated to me by my foreign correspondent, I declare that what I claim is :—

First. An air forcing apparatus comprising a wheel having a continuous periphery or rim, as the fly wheel of a steam engine, combined with air ducts and deflecting mouth pieces therefor, for the purpose of removing the air from the wheel, and directing it into the said ducts, substantially as described.

Second. The combination of a wheel having a rim and spokes which constitute an air propeller, with an inwardly curved deflector at one side of said wheel and an air duct having an open mouth with deflecting walls at the other side of the said wheel, substantially as and for the purpose described.

Third. The combination of a fly wheel having a continuous periphery or rim, with an air duct and a deflecting mouth piece for said duct extending towards the said wheel, between the rim and the axis of rotation of the wheel, and terminating in a position substantially tangential to the wheel, substantially as and for the purpose described.

Dated this 7th day of July 1891.

HASELTINE, LAKE & Co.,
45, Southampton Buildings, London, W.C., Agents for the Applicant.

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